TASAI

THE AFRICAN SEED ACCESS INDEX

Uganda Brief 2018 - The African Seed Access Index

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INTRODUCTION

A competitive seed sector is key to ensuring timely availability of high quality seeds of improved, appropriate varieties at affordable prices to smallholder farmers in Uganda. This country brief summarizes the key findings of The African Seed Access Index (TASAI) study conducted to appraise the structure and economic performance of Uganda's seed sector in 2017. With a focus on four grain and legume crops important to food security in Uganda — maize, beans, millet, and sorghum — the study evaluates the enabling environment for a vibrant formal seed sector. These four crops account for about 35% of arable land in Uganda (FAOSTAT, 2017). The study covers 20 indicators divided into the following categories: Research and Development, Industry Competitiveness, Seed Policy and Regulations, Institutional Support, and Service to Smallholder Farmers. Appendix 1 summarizes all 20 indicators and compares Uganda to 12 other countries where similar studies were conducted. TASAI seeks to encourage public policymakers and development agencies to create and maintain enabling environments that will accelerate the development of competitive formal seed systems serving smallholder farmers.

Overview

Like most other African countries, the seed industry in Uganda consists of two systems: the informal sector and the formal sector. This policy brief focuses almost exclusively on the formal seed sector.

The informal sector broadly refers to the system where farmers produce, obtain, maintain, develop and distribute seed resources, from one growing season to the next (FAO, 1998). Because of limited exposure, low availability of varieties, inability to purchase seeds, limited access to agro-dealers, or other reasons, most smallholder farmers in Uganda still rely at least in part on informal seed systems. In cases where the farmer is unable to retain part of the harvest, or where a farmer decides to plant a different variety, seed is generally acquired from the local community, including markets and farmers' social networks. This is true particularly for crops other than maize. Standards in the informal seed systems are not monitored or controlled by government policies and regulations; rather, they are guided by indigenous knowledge and standards, and by social structures.

The formal sector focuses on breeding and evaluating improved varieties and producing and selling seed of these varieties that is certified by the National Seed Certification Service (NSCS). NSCS is the government entity under the Ministry of Agriculture, Animal Industry and Fisheries (MAAIF) responsible for regulating Uganda's seed industry. As shown in Table 1, Uganda's formal seed sector comprises many institutions including government (e.g. NSCS, NARO, MAAIF, agro-dealers, seed companies, and county extension agents), private sector (MNCs and local seed companies), and development agents (NGOs and CBOs). The apex seed association, the Uganda Seed Trade Association (USTA) plays an important role in sharing information and advancing members' interests.

Table 1: Role of key players in Uganda's formal seed sector

ROLE	KEY PLAYERS
Research and breeding	NARO, NaCRRI, NaSARRI, CGIAR, AATF
Variety release & regulation	NSCS, MAAIF, NSB
Breeder and foundation seed production	NARO, NaCRRI, NaSARRI; local seed companies, MNCs, AATF
Seed production	Seed companies, local seed businesses
Processing and packaging	Seed companies
Education, training, extension	Seed companies, extension agents, farmers' organizations, NGOs, agro-dealers, USTA
Distribution and sales	Seed companies, rural agro-dealers, NGOs

Key Acronyms: AATF – Africa Agricultural Technology Foundation, **CIMMYT** – International Maize and Wheat Improvement Center, **DCIC** – Department of Crop Inspection and Certification, **DUS** – Distinctness, Uniformity, and Stability, **ISTA** – International Seed Testing Association, **LSBs** – Local Seed Businesses, **MAAIF** – Ministry of Agriculture, Animal Industry and Fisheries, **MNCs** – Multinational Corporations, **NAADS** – National Agricultural Advisory Services, **NaCRRI** - National Crop Resources Research Institute, **NARO** – National Agricultural Research Organization, **NaSARRI** - National Semi-Arid Resources Research Institute, **NGOs** – Non-Governmental Organizations, **NSCS** – National Seed Certification Service, **NSB** – National Seed Board, **OWC** – Operation Wealth Creation, **OPVs** - Open Pollinated Varieties, **QDS** – Quality Declared Seed, **UPHIA** – Uganda Plant Health Inspectorate Agency, **USTA** – Uganda Seed Traders Association, **VCU** – Value for Cultivation and Use, **VRC** – Variety Release Committee.

RESEARCH AND DEVELOPMENT

Number of active breeders

For the four priority crops in Uganda – maize, beans, finger millet[1], and sorghum – there are 15 active breeders. Most of the breeders (7 of 15) focus on maize, while four breeders focus on beans, and two each on millet and sorghum. Several foreign-owned companies use the breeding capacity of their regional headquarters outside Uganda. Of the 15 breeders, two are from the private sector while 13 are from the two National Agricultural Research Organization (NARO) institutes: the National Crop Resources Research Institute (NaCRRI) has nine breeders focused on maize and beans, while the National Semi-Arid Resources Research Institute (NaSARRI) has four breeders focused on sorghum and millet. NaCRRI has more breeders than NaSARRI in part because it has received technical and financial support from the Africa Agricultural Technology Foundation (AATF), Alliance for a Green Revolution in Afrca (AGRA)Pan-African Bean Research Alliance (PABRA), and CGIAR institutions, namely the International Institute of Tropical Agriculture (IITA) and International Maize and Wheat Improvement Center (CIMMYT) under the Drought-Tolerant Maize for Africa project, and the International Centre for Tropical Agriculture (CIAT). On the other hand, NaSARRI lacks the financial means to maintain a comprehensive breeding program. On average, seed companies' rate their satisfaction with the number of active breeders as good (69%). The highest level is satisfaction is for beans (80%) and maize (72%), while the satisfaction with sorghum breeders is fair (55%). The lowest satisfaction is with millet breeders: 40%.[2]

Varieties released in the last three years

Between 2015 and 2017, a total of 40 varieties were released across the four crops. Of these, 26 were maize, five each were bean and millet, and four were sorghum varieties. Unsurprisingly, the number of varieties released correlates strongly with the number of active breeders. Figure 1 shows the trend for variety releases (using three-year moving averages) for the four crops between 2000 and 2017. Variety releases for maize outnumber the combined variety releases for beans, millet, and sorghum. There was a notable increase in the number of maize variety releases from 2012. This was partly due to the entry

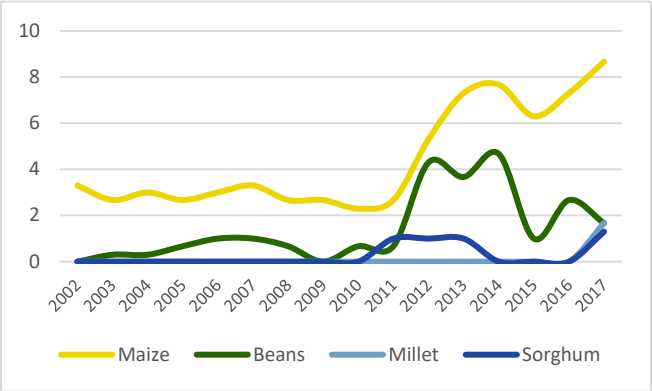

Figure 1: Trend in variety releases between 2002-2017 (three-year moving average)

of foreign companies and the development and release of Water Efficient Maize for Africa varieties by AATF. By contrast, there were no releases for millet between 2000 and 2016, and no sorghum releases between 2000 and 2011. One reason for the low number of sorghum releases is because there is no hybrid sorghum breeding program in the country.

Availability of basic seed

Most seed companies source their foundation seed from the NARO institutes: NaCRRI for maze and bean seed and NaSARRI for sorghum and millet. All the millet and bean seed-producing companies source foundation seed from these institutions. Three of the 18 maize seed-producing companies and two of the 11 sorghum seed-producing companies are foreign-owned and source their foundation seed from their regional/continental breeding programs. The main sources of maize foundation seed from outside Uganda are Kenya (for five companies), Tanzania (for one company), and Zimbabwe (for four companies), while one company sources sorghum foundation seed from India and another from Zimbabwe[3]. All bean and millet foundation seed is sourced from within Uganda.

On average, seed companies rate the availability of basic seed for the four crops as good (62%). The companies are more satisfied with the availability of basic seed for maize (72%), and less satisfied with the availability for the other three crops - beans (59%), millet (50%), and sorghum (55%). This is logical, given the greater investment in maize breeding programs by national and international agricultural research organizations.

[1] Herein referred to as millet

[2] All scores reported in this brief are based on industry self-reporting of satisfaction ranging from 0% (completely dissatisfied) to 100% (completely satisfied).

[3] Note that these country sources also apply for basic seed sourced from CGIAR centers based outside Uganda.

Number of varieties sold in 2017

In 2017, seed companies sold 68 varieties of the four crops. Of these, 41 were maize varieties, 13 were bean varieties, 6 were millet varieties and 8 were sorghum varieties. The most popular maize varieties were Longe4, Longe5, Longe5D, and MM3. Longe4 and Longe5 are open pollinated varieties (OPVs) that were released in 2000 and are popular for their early maturing and nutritional characteristics, respectively. Longe4 is also popular for its resistance to maize streak virus. MM3 is a derivative of Longe4.

The most popular bean varieties in 2017 were K132 (released in 1994) and NABE4 (released in 1999). These varieties have been left in the market as landraces and are classified as standard seed. The most popular millet varieties in 2017 were PESE1 and PESE2, released in 1989 and 1995 respectively, while the most popular sorghum varieties were Sekedo and Epuripuri (both released in 1995). These varieties are classified as standard seed and are sold primarily to relief agencies.

Number of varieties dropped over the last 10 years

Many of the seed companies – 50% of maize companies, 59% of bean companies, 50% of millet companies and 33% of sorghum companies - reported dropping varieties between 2008 and 2017. In total, companies reported dropping 25 varieties for the four crops – nine maize varieties, seven bean varieties, three millet varieties, and six sorghum varieties.

Interestingly, some of the varieties dropped by some seed companies are still commercialized by others. Dropped varieties include SC407, Longe4, Longe5, Longe10H, YARA41, Victoria2, ZM652, and Ssalongo (for maize); NABE4, NABE5, NABE11, NABE17, K131, and K132 (for beans); PESE1, PESE2, and Seremi1 (for millet), and Sekedo, Epuripuri, Seso1, and Seredo (for sorghum). The reasons for dropping these varieties include the need for replacement with superior varieties, low tolerance to drought, high level of adulteration (especially with maize OPVs), lack of foundation seed (especially for bean varieties), degeneration of the variety (for the K132 bean variety) and low yields.

Average age of varieties sold in 2017

The average age of the varieties sold in 2017 was as follows: 6 years for maize, 11 years for beans, 16 years for millet, and 12 years for sorghum. The youngest varieties for three of the four crops (maize, bean, and millet) are one-year old. Four sorghum varieties released in 2017 were not yet commercialized by the end of that year. The youngest sorghum variety on the market in 2017 was released in 2011. The oldest varieties were 17 years for maize, 23 years for beans, 28 years for millet, and 22 years for sorghum.

The ongoing sale of old varieties suggests a reluctance to switch to new varieties by some farmers. This applies to all four crops. There are 37 varieties of beans, millet, and sorghum released after 2002, yet the oldest varieties on the market were more than 20 years old.

Varieties with climate-smart features

To be classified as climate-smart, a crop variety must meet at least one of two criteria: early maturity and/or tolerance to extreme weather conditions such as drought, flooding, or frost. For maize, 8 of 26 varieties released between 2015 and 2017 were climate-smart, with drought tolerance being the dominant trait (for 6 of the 8 varieties). Only three of the five released bean varieties were climate smart – all early-maturing. All three climate smart sorghum varieties (of the four released) were drought-tolerant.

INDUSTRY COMPETITIVENESS

Number of active seed companies

In 2017, there were 34 registered seed companies in Uganda. Of these, 20 produced and marketed at least one of the four focus crops. Of the 20 companies that produced certified seed for the four crops, 19 produced maize seed, 17 produced bean seed, six produced millet seed, and 12 produced sorghum seed. Five of the 20 seed companies are foreign-owned.

On aggregate, the seed companies produced 21,959 MT of maize seed, 3,794 MT of bean seed, 19 Mt of millet seed, and 2,302 MT of sorghum seed in 2017. Total sales of maize seed in 2017, aggregated from individual company sales, were 17,013 MT. This is a notable increase from the 9,500 MT of maize seed sold in 2015. Seed sales for the other crops were 2,957 MT (beans), 12 MT (millet), and 1,857 MT (sorghum).

Market share of top seed companies

Market concentration is calculated in two ways. First, by calculating the sales of the top four companies as a percentage of total industry output for each commodity. Using this method, the volume weighted market share for the top four companies by crop was 69% for maize, 61% for beans, 100% for millet, and 72% for sorghum. Figure 2 illustrates the market shares.

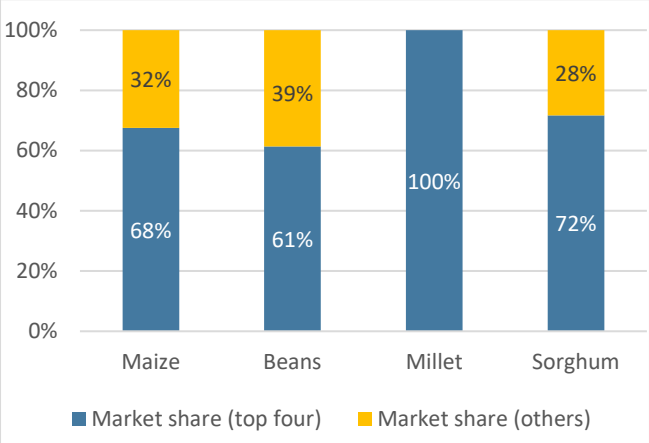

Figure 2: Market Share (%) of Top Four Companies

Market concentration was also analyzed using the Herfindal-Hershman Index (HHI). The HHI measures market concentration by squaring the market share of each firm competing in a market and then summing the resulting numbers. HHI can range from close to zero (perfect competition) to 10,000 (monopoly). HHI was calculated for each of the four crops. The HHI for three crops - maize (1,425), beans (1,214), and sorghum (1,703) - is good. Due to the low number of active companies producing millet seed, the HHI score for millet is extremely poor (5,139). The market shares of the top four companies and the HHI results both indicate that the seed market for three crops – maize, beans, and sorghum – is competitive, with many active seed companies, none of which is dominant. The millet seed market is less competitive due to the low number of active seed companies.

Market share of government parastatal

There is no active government parastatal involved engaged in the production and marketing of certified seed in Uganda.

Length of import/export process for seed

The time it takes to import/export seed is calculated as the number of days from of application for an import/export permit, to the time when the consignment reaches the border point of entry/exit. NSCS only issues import and export permits to entities registered as seed merchants.

Of the 20 seed companies, four (all foreign-owned) imported seed into Uganda in 2017. The main seed imported into Uganda in 2017 was maize (967 MT from Kenya and Zimbabwe) and sorghum (200 MT through Kenya). The main border point of entry was Malaba, on the Uganda-Kenya border. Seed companies reported that it took an average of 14.5 days to import seed into Uganda. Most of the time (8 days) was spent obtaining the relevant documentation including the import permit and phytosanitary certificate, and about 4 days was spent clearing the seed at the border point of entry. The main causes of delay were clearing of documents and cargo traffic at the border. Nevertheless, seed companies rate the import process as good (70%).

Five of the 20 active seed companies exported seed in 2017. A total volume of 2,207 MT of seed was exported, equal to 10% of total sales in 2017. Companies exported 1,305 MT of maize seed (8% of total maize seed sales), 56 MT of beans (2% of total bean seed sales), 4 MT of millet seed (33% of total millet seed sales), and 842 MT of sorghum seed (45% of total sorghum seed sales). The main export destination was South Sudan (1,937 MT or 88% of total exports). Exports to South Sudan were mainly to emergency relief agencies. Other destinations were Burundi (100 MT), Tanzania (80 MT), Democratic Republic of Congo (45 MT), and Kenya (45 MT). The main border points of exit were Nimule (to South Sudan), Malaba (to Kenya), Bunagana (to DRC) and Port Bell (to Tanzania). Seed companies reported that it took 15 days to export seed and rated the exportation process as good (60%).

SEED POLICY AND REGULATIONS

Length of variety release process

The length of the variety release process is the duration of time from when the application for variety release is submitted to the Variety Release Committee (VRC), to when the variety is approved for released by NSCS. Prior to the release of a crop variety, the variety is evaluated for distinctness, uniformity, and stability (DUS) and value for cultivation and use (VCU). According to the seed regulations, DUS tests should be carried out for at least two seasons, while VCU tests should be conducted in at least

four agro-ecological zones. There are normally two sittings of the VRC every year. According to seed companies and breeders, the average time for variety release is 28 months.

The official cost for DUS tests is UGX 350,000 (or USD 100)[4] per variety while VCU tests cost UGX 800,000 (USD 220) per variety. In addition, breeders pay UGX 100,000 (USD 30) to have a variety listed in the National Variety Catalogue. However, seed companies and breeders reported incurring higher costs of USD 1,200 to USD 5,000 during the variety release process. These costs include transport and living costs for staff that travel to different sites during the on-farm trials, site management, crop assessments, and evaluation. Similarly, research institutes reported paying USD 350 (UGX 1,225,000) for the DUS test, as opposed to the official rate of UGX 350,000. Despite the high costs, seed companies rate the variety release process as good (75%), while NSCS and NARO rated the process as excellent (80% and 90%, respectively).

Status of seed policy framework

Uganda's national seed policy was most recently updated in 2016 but has yet to be passed by the Cabinet. Under the current institutional arrangement, NSCS is under the Department for Crop Inspection and Certification (DCIC). In addition, NSCS serves as the secretariat for the National Seed Board (NSB), which advises the Ministry on all seed-related issues. The policy proposes to transform the DCIC into a semi-autonomous agency called Uganda Plant Health and Inspectorate Agency (UPHIA). UPHIA will be responsible for all plant health services, seed regulatory services, and agricultural and plant related chemical regulatory services (MAAIF, Uganda National Seed Policy - Draft 7, 2016).

The Seeds and Plant Act of 2006 is the main law governing the seed industry. The law establishes the NSB and NSCS. The Seeds and Plant Regulations of 2017 were developed as implementing instruments for the Act. The Regulations provide details related to plant breeding, variety release, seed multiplication, seed conditioning, seed marketing, seed importation and exportation, and quality assurance of seeds and other planting materials. MAAIF has also developed the National Seed Strategy (MAAIF, 2016)

Uganda is a member of both the Common Market for Eastern and Southern Africa (COMESA) and the East African Community (EAC). Uganda's seed regulations have been amended to conform to COMESA's harmonized seed regulations, the goal of which is to facilitate the movement of certified seed within the region. However, none of the Ugandan seed companies have yet listed any varieties in the COMESA seed catalogue.

MAAIF intends to apply for International Seed Testing Agency (ISTA) accreditation of the national seed laboratory in 2018. Prior to submitting this application, MAAIF plans to increase staffing levels at the laboratory to meet ISTA requirements.

Quality of seed regulations and enforcement

Seed companies have a favorable opinion of the quality of the seed law and regulations in Uganda, rating them as good (60%). Companies are less satisfied with their enforcement, which was rated as fair (48%). Seed companies cited a need for the recruitment, training, and deployment of more qualified seed inspectors to monitor seed companies' production and processing activities, to ensure seed quality throughout the value chain.

Adequacy of seed inspectors

Seed inspection is the mandate of NSCS. Unfortunately, NSCS has a significant shortage of inspectors, employing just seven in 2017. This shortage is due to the inadequate financial means at the institution's disposal. In 2014, NSCS had a budget shortfall of 70% for staffing of inspectors (Naluwairo & Barungi, 2014). Seed companies rate their satisfaction with seed inspection services as fair (59%). In addition to the seven seed inspectors, MAAIF has trained phytosanitary inspectors who are stationed at the major border points. These inspectors handle both phytosanitation and seed imports.

Several seed companies have supported a private initiative that aims to verify the seed quality at the production and processing stages. The initiative, called Ag-Verify, was initially financed under a USAID-funded project and now has a management team in place. Under this arrangement, Ag-Verify would provide two core services, namely: (i) training and deploying private seed inspectors and (ii) verifying the quality of seed produced by seed companies. For the latter, samples from the seed companies' fields

[4] Exchange rate: USD 1 = UGX 3,500

are tested at an ISTA-accredited laboratory, managed by a private company called Chemiphar. These services are intended to complement the mandatory services of seed inspection and certification provided by NSCS. However, NSCS is yet to harmonize the proposed roles of Ag-Verify under the current arrangement of seed certification and inspection. As such, seed companies can opt to use the services of Ag-Verify at their own cost, and in complement to NSCS services. Lack of an agreement on the working model has led to questions about the viability of the model.

Efforts to stamp out fake seed

Seed companies reported 14 cases of fake seeds in 2017. This is likely to be an under-estimate as most cases go unreported. Seed companies rate the government's efforts to stamp out fake seed as fair (53%). According to the seed companies, the main sources of fake seed are seed companies, seed distributors and retailers (seed stockists). The problem of fake seed is partly fueled by the government seed distribution program, called Operation Wealth Creation (OWC). This is due to the weak and unpredictable seed procurement arrangements, which do not have sufficient checks for seed quality and seed sources.

The industry, led by the Uganda Seed Trade Association (USTA), has been conducting awareness on the problem of fake seed. Seed companies are encouraged to use tamper-proof labels, provided by MAAIF, on their seed packages. In addition, companies are encouraged to appoint trusted agents who should be forwarded to the Ministry for licensing.

Use of smart subsidies

Operation Wealth Creation (OWC) is a government initiative through which agricultural inputs are procured and distributed to farmers through local governments. OWC was officially launched in June 2014 as an intervention coordinated by the army, Uganda Peoples Defense Forces. OWC is being implemented with funding under the National Agricultural Advisory Services (NAADS) secretariat and its operation aligns with the new mandate of providing agricultural inputs to farmers. NAADS is an agency under MAAIF. Seed companies that sell seed to NAADS are required to produce crop and factory inspection reports from NSCS, seed inventory reports, and evidence of tax clearance from Uganda Revenue Authority. In addition, NSCS advises NAADS on seed companies' capacity, based on their production returns and inspection reports. Seed companies that meet the criteria are then invited to respond to tenders from NAADS. NAADS provides information on the required seed types and seed volumes for the different local governments.

In 2017, nine seed companies sold maize seed, seven companies sold bean seed, and three companies sold sorghum seed to NAADS. On aggregate, seed companies sold 8,856 MT of maize seed (52% of overall maize seed sales), 1,359 MT of bean seed (46% of overall bean seed sales), and 180 MT of sorghum seed (10% of overall sorghum seed sales) to NAADS. These volumes indicate that NAADS was a major buyer of seed in 2017.

Despite the high volumes of seed sales to NAADS and the explicit procurement procedures, seed companies are not satisfied with the procurement arrangements. Seed companies rate the transparency process in seed procurement as fair (59%); the clarity in requirements and procedures as fair (57%); predictability in the procurement process as poor (36%); and efficiency in government payments as fair (48%). Seed companies stated that the seed procurement process was marred by numerous uncertainties and irregularities. As a result, several seed companies had opted out of selling to NAADS.

INSTITUTIONAL SUPPORT

Availability of extension services

According to the National Agricultural Extension Strategy, by 2014 the ratio of agricultural extension staff to farmers was estimated to be over 1:5,000 (MAAIF, 2014). The low number of government extension officers is partly due to the restructuring process under NAADS, the agency that used to manage agricultural extension. All extension staff who were recruited under NAADS have been discharged. The seed companies employ a total of 176 extension officers, of whom 49 are male and 127 are female. Seed companies rate their satisfaction with extension services as fair (59%).

Quality of national seed trade association

Formed in 1999, the Uganda Seed Traders Association (USTA) is a member-based association for all seed merchants in Uganda. USTA has 27 members, of which 23 are seed companies and four are associate members. USTA

plays a key role in liaising between private seed companies and the government on all seed industry matters.

Figure 3 illustrates seed companies' level of satisfaction with USTA's performance in seven service areas. The companies rate their satisfaction with the overall quality of USTA as good (65%). USTA's highest rating is in democracy and governance (71%), while the lowest ratings are in its ability to mobilize resources (51%) and facilitating business opportunities for members (59%). In all other areas – effectiveness in advocacy, activity on important seed sector issues, managerial ability, and providing value to members - USTA's members rate the association as good (64% to 66%).

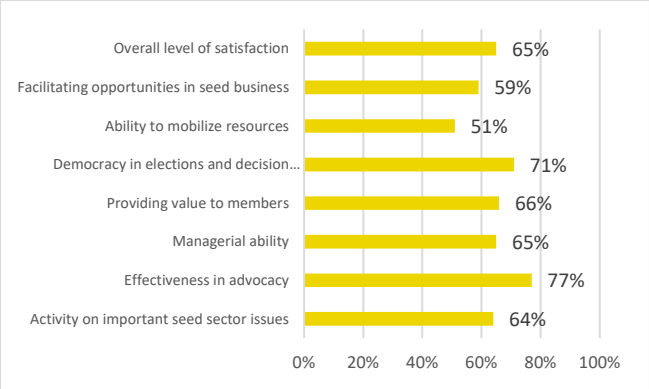

Figure 3: Members' satisfaction with USTA

SERVICE TO SMALLHOLDER FARMERS

Concentration of rural agro-dealer network

The most recent census for agro-input dealers was conducted in 2009 and revealed that there about 2,064 agro-dealers in the country. However, the Uganda National Agro-Dealers Association estimates that the number of agro-input dealers ranges from 2,500 to 3,000. MAAIF estimates that only 500 agro-dealers are trained and accredited. The Ministry intends to train more than 1,000 agro-dealers over the next two years. Using the lower limit of 2,500 agro-dealers, the ratio of agro-dealers to agricultural households is 1:1,580. Seed companies rate their satisfaction with the rural agro-dealer network as good (61%).

Availability of seed in small packages

Across the four crops, 25% of seed sold in 2017 was sold in small packages of 2 kg or less, though there are notable differences by crop. All millet seed was sold in packages of 2 kg or less. For the other three crops, less than half of seed was sold in small packages. The percentage sold in small packages was 25% for maize seed, 9% for bean seed, and 48% for sorghum seed. Most of the maize seed (69%) and bean seed (72%) was sold in packages of greater than 2 kg but not more than 10 kg.

Despite the low volumes sold in small packages, seed companies are satisfied with the availability of seed in small packages. The rating of satisfaction is good for beans (64%) and millet (72%) and excellent for maize (82%) and sorghum (80%), indicating that there is no need to make changes to the current seed package sizes for the four crops. Figure 4 shows a breakdown of the percentage of seed sold in the different package sizes for each crop.

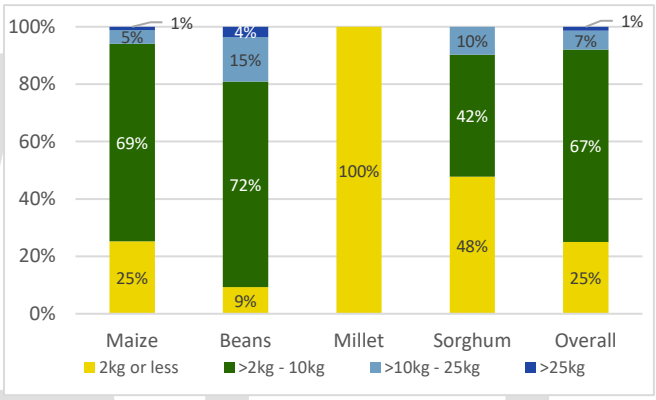

Figure 4. Percentage of seed sold in different package sizes

Seed-to-grain price ratio

Assuming stable prices at planting time, the seed-to-grain price ratio can reflect the extent to which a variety is improved, as reflected in the cost of production; and the costs of transacting in the seed market (Nagarajan & Smale, 2005). Four the four crops, the highest ratio is for hybrid maize (6:1). This is understandable due to the high cost of production and processing associated with hybrids. The second highest ratio is for OPV maize (3:1). This supports the early findings that some of the OPV maize varieties are the most popular maize varieties due to characteristics such as early-maturity, resistance to maize streak virus, and nutritional benefits. The ratios for the other crops are 1.2:1 (bean), 1:1 (millet), and 1.2:1 (sorghum). From a seed company's perspective, the low seed-to-grain price ratios for these three crops reflect competition from farmer-recycled seed, as the prices are similar.

Status of Quality Declared Seed (QDS)

Quality Declared Seed (QDS) is a seed class in Uganda's draft National Seed Policy of 2016. QDS requires mini-

mum field inspection and certification standards for variety, purity, and germination. To promote QDS, an organization called Integrated Seed Sector Development has organized and empowered seed producers, farmer organizations, and co-operatives into Local Seed Businesses (LSBs).

Of the four focus crops, LSBs only produce beans. In 2017, a total of 107 LSBs were supported to grow 15 different varieties of bean seed. LSBs source foundation seed from NaCCRI and, in 2017, they produced the NABE variety series, NARO series, ROBA1, and K132. Since their inception, LSBs have dropped two bean varieties (NABE11 and NABE20); the latter was dropped due to its physical likeness to NABE 15, which is preferred in the market.

In 2017, LSBs produced 237.1 MT of bean seed, with most production in season B. They sold 160.5 MT of bean seed, of which 96.3MT was sold in season A. No bean seed was sold to the government under the OWC program, mainly because QDS seed can only be sold in the area in which it is produced. QDS beans were sold in two different package sizes: most (60% of volume) was sold in 25 kg packages, while the remaining 40% was sold in small packages of 2kg or less. NSCS intends to develop regulations specifically for QDS. In addition, there is a need to amend the Seeds and Plant Act 2006 to include QDS as a seed class.

CONCLUSION

Uganda's seed sector is at a critical stage in its growth. Several seed companies opine that local demand for certified seed is growing, the evidence of which is an increase in aggregate seed sales of over 80% between 2015 and 2017. However, this growth is largely driven by the government's OWC initiative. In addition, the country is a net seed exporter for the four crops, though these exports are largely driven by relief agency purchases for South Sudan. In this context, the growth in both the local and export markets should be taken with caution, as the drivers are not sustainable in the long-term. Nevertheless, the progress made towards harmonization of seed regulations across the COMESA region offers the potential to widen the scope for regional trade. Further, the development of the QDS market bodes well for the overall demand for certified seed as it increases farmers' appreciation for quality seed.

Beyond the market growth prospects, there are several notable improvements and opportunities in the seed sector. The process to import and export seed is well-defined and efficient, though efforts can be made to reduce the time spent processing the import/export permits and phytosanitary certificates. The initiative to establish a private seed company, NARO Holdings, to specialize in the production of basic seed is very positive. If well managed, the company would respond to the seed companies' challenge of inadequate foundation seed.

In line with the Seeds and Plant Regulations (MAAIF, 2010), and the Seeds and Plant Act 2006 (MAAIF, 2006) the Ministry should accredit qualified officials to conduct seed inspection and testing services., which would complement the existing NSCS seed inspection services. Effective and transparent inspection services are critical for seed quality assurance along the entire value chain. This is timely given the goodwill among the private sector and the presence of a private company with the professional experience and facilities to run this service. This effort would need to be complemented by strengthening the NSCS via funding increases.

Further, seed companies have expressed a high level of satisfaction with their association, USTA, on most fronts. USTA is cementing its position as a relevant platform through which the private sector can engage with the government. This strength needs to be further exploited to drive much-needed industry reforms, most notably in private seed inspection services and combatting counterfeit seed. Lastly, MAAIF should close the remaining gaps in the seed policy environment by passing the National Seed Policy, which should lead to the establishment of UPHIA. The Ministry should also draft the Regulations for the Plant Variety Protection Act and QDS.

Despite these opportunities, Uganda's seed industry faces several notable challenges. The first main challenge is the high incidence of fake seed. The government's efforts to involve the national police force is a step in the right direction, though NSCS is significantly under-funded and the institution does not have sufficient resources to adequately ensure seed quality is maintained at the key stages of seed production, processing, and marketing. Another challenge pertains to the seed subsidy program under OWC and managed by NAADS. Seed companies are not satisfied with the transparency, predictability, and

clarity in the seed procurement process. If not well-managed, the program may be abused. More importantly, the subsidy program creates a sense of artificial demand for seed, which is unsustainable in the long-run.

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APPENDIX 1.

For a comparison of TASAI Indicators across 13 countries, please visit: http://tasai.org/wp-content/uploads/TASAI-Appendix-CURRENT.pdf

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		Country	DR-CONGO		ETHIOPIA		GHANA		KENYA		MADAGASCAR		MALAWI		MOZAMBIQUE		SENEGAL		SOUTH AFRICA		TANZANIA		UGANDA		ZAMBIA		ZIMBABWE		AVERAGE
		Year	2016		2016		2016		2015		2016		2016		2016		2016		2016		2016		2017		2016		2016		
Focus crop 1	Area harvested in hectares		Maize	1,506,884	Maize	2,114,876	Maize	1,019,000	Maize	2,116,141	Maize	215,113	Maize	1,676,213	Maize	1,703,500	Maize	146,361	Maize	2,688,200	Maize	4,146,000	Maize	1,105,000	Maize	1,205,202	Maize	2,283,803	1,686,638
Focus crop 2	Area harvested in hectares		Rice	405,074	Wheat	1,663,845	Rice	224,000	Sorghum	213,520	Rice	961,831	Beans	329,959	Rice	376,500	Rice	134,973	Soya bean	502,900	Beans	1,134,394	Sorghum	373,000	Rice	33,207	Beans	69,651	494,066
Focus crop 3	Area harvested in hectares		Beans	459,100	Teff	3,762,000	Soya bean	97,957	Beans	1,052,408	Beans	73,017	Groundnut	373,925	Cowpea	377,900	Groundnut	878,659	Sunflower	598,950	Soya bean	5,907	Beans	674,000	Groundnut	237,423	Soya bean	56,312	665,197
Focus crop 4	Area harvested in hectares		Soya bean	41,206	Sorghum	1,834,650	Cowpea	168,659	Cowpea	281,877	Groundnut	53,000	Soya bean	139,005	Soya bean	15,000	Millet	715,996	Wheat	476,570	Pigeon pea	250,509	Millet	175,000	Beans	88,673	Sorghum	588,945	371,468
Number of farming households	Millions			15.6		2.5		6.4		2.43		2.64		3.17		0.76		2.3		5.8		9.1		1.47		0.6		4
Population	Millions			78.7		102.4		28.2		44.0		24.9		18.1		28.8		15.4		55.9		55.6		41.5		16.6		16.2	40
Total land area	Millions of hectares			234.5		110.4		23.8		58.0		58.7		11.8		78.6		19.3		121.3		88.6		24.0		74.3		38.7	72
Arable land	% of total land area			3%		15%		21%		5%		15%		40%		7%		17%		10%		15%		34%		5%		10%	15%
Ease of Doing Business rank	2017 rank out of 190 countries			184		159		108		92		167		133		137		147		74		132		115		98		161	131
A.	RESEARCH AND DEVELOPMENT																												
1	Number of active breeders	Crop 1	Maize	7	Maize	23	Maize	10	Maize	34	Maize	2	Maize	4	Maize	6	Maize	2	Maize	27	Maize	28	Maize	7	Maize	17	Maize	17	14
		Crop 2	Rice	3	Wheat	20	Rice	5	Sorghum	7	Rice	21	Beans	3	Rice	8	Rice	4	Soya bean	7	Beans	7	Sorghum	2	Rice	5	Beans	5	7
		Crop 3	Beans	2	Teff	15	Soya bean	5	Beans	17	Beans	3	Groundnut	2	Cowpea	4	Groundnut	3	Sunflower	10	Soya bean	7	Beans	4	Groundnut	3	Soya bean	6	6
		Crop 4	Soya bean	2	Sorghum	16	Cowpea	6	Cowpea	5	Groundnut	3	Soya bean	2	Soya bean	2	Millet	3	Wheat	9	Pigeon pea	4	Millet	2	Beans	1	Sorghum	4	5
		Total		**14**		**74**		**26**		**63**		**29**		**8**		**20**		**12**		**53**		**46**		**15**		**26**		**32**	32
	Adequacy of breeders (score out of 100)	Crop 1	Maize	60	Maize	75	Maize	85	Maize	68	Maize	66	Maize	71	Maize	90	Maize	17	Maize	94	Maize	63	Maize	72	Maize	64	Maize	92	69
		Crop 2	Rice	50	Wheat	-	Rice	70	Sorghum	48	Rice	69	Beans	46	Rice	90	Rice	50	Soya bean	98	Beans	54	Sorghum	55	Rice	80	Beans	83	65
		Crop 3	Beans	-	Teff	100	Soya bean	60	Beans	57	Beans	74	Groundnut	56	Cowpea	63	Groundnut	61	Sunflower	96	Soya bean	54	Beans	80	Groundnut	55	Soya bean	93	71
		Crop 4	Soya bean	-	Sorghum	10	Cowpea	80	Cowpea	48	Groundnut	73	Soya bean	54	Soya bean	68	Millet	25	Wheat	85	Pigeon pea	37	Millet	0	Beans	60	Sorghum	73	52
		Average satisfaction		**55**		**70**		**72**		**54**		**70**		**58**		**77**		**38**		**88**		**57**		**69**		**66**		**86**	66
2	Number of varieties released in last three years	Crop 1	Maize	6	Maize	12	Maize	17	Maize	61	Maize	0	Maize	17	Maize	5	Maize	0	Maize	236	Maize	44	Maize	26	Maize	37	Maize	34	38
		Crop 2	Rice	4	Wheat	15	Rice	0	Sorghum	3	Rice	13	Beans	0	Rice	3	Rice	0	Soya bean	71	Beans	2	Sorghum	4	Rice	3	Beans	7	10
		Crop 3	Beans	10	Teff	3	Soya bean	0	Beans	14	Beans	0	Groundnut	0	Cowpea	0	Groundnut	7	Sunflower	38	Soya bean	0	Beans	5	Groundnut	2	Soya bean	4	6
		Crop 4	Soya bean	0	Sorghum	7	Cowpea	0	Cowpea	2	Groundnut	0	Soya bean	0	Soya bean	0	Millet	0	Wheat	17	Pigeon pea	4	Millet	5	Beans	2	Sorghum	3	3
		Total		**20**		**37**		**17**		**80**		**13**		**17**		**8**		**7**		**362**		**50**		**40**		**44**		**48**	57
3	Availability of foundation seed (score out of 100)	Crop 1	Maize	65	Maize	58	Maize	70	Maize	62	Maize	51	Maize	65	Maize	42	Maize	77	Maize	80	Maize	72	Maize	72	Maize	76	Maize	84	67
		Crop 2	Rice	61	Wheat	54	Rice	62	Sorghum	77	Rice	62	Beans	49	Rice	85	Rice	74	Soya bean	49	Beans	61	Sorghum	55	Rice	68	Beans	76	64
		Crop 3	Beans	63	Teff	58	Soya bean	68	Beans	53	Beans	63	Groundnut	58	Cowpea	40	Groundnut	83	Sunflower	66	Soya bean	65	Beans	59	Groundnut	40	Soya bean	88	61
		Crop 4	Soya bean	62	Sorghum	60	Cowpea	68	Cowpea	52	Groundnut	54	Soya bean	52	Soya bean	46	Millet	79	Wheat	73	Pigeon pea	45	Millet	50	Beans	57	Sorghum	77	60
		Average satisfaction		**64**		**57**		**67**		**68**		**60**		**56**		**54**		**78**		**67**		**67**		**62**		**76**		**79**	66
4	Average age of varieties sold (years)	Crop 1	Maize	17.6	Maize	5.4	Maize	12.5	Maize	9.4	Maize	24.0	Maize	5.7	Maize	11.0	Maize	19.0	Maize	4.0	Maize	10.0	Maize	6.7	Maize	10.0	Maize	8.5	11
		Crop 2	Rice	16.5	Wheat	4.8	Rice	5.0	Sorghum	24.1	Rice	19.0	Beans	11.0	Rice	2.0	Rice	17.0	Soya bean	4.0	Beans	18.0	Sorghum	12.4	Rice	4.0	Beans	5.6	11
		Crop 3	Beans	22.0	Teff	6.7	Soya bean	8.5	Beans	14.7	Beans	18.0	Groundnut	18.0	Cowpea	21.0	Groundnut	20.0	Sunflower	5.0	Soya bean	10.0	Beans	11.0	Groundnut	29.0	Soya bean	8.2	15
		Crop 4	Soya bean	18.0	Sorghum	6.0	Cowpea	14.0	Cowpea	16.9	Groundnut	51.0	Soya bean	8.0	Soya bean	5.0	Millet	16.0	Wheat	7.0	Pigeon pea		Millet	16.0	Beans	12.0	Sorghum	12.0	15
	Number of varieties sold	Crop 1	Maize	41	Maize	23	Maize	18	Maize	74	Maize	3	Maize	57	Maize	11	Maize	3	Maize		Maize	44	Maize	41	Maize	88	Maize	59	39
		Crop 2	Rice	20	Wheat	31	Rice	16	Sorghum	14	Rice	44	Beans	15	Rice	3	Rice	24	Soya bean		Beans	8	Sorghum	8	Rice	2	Beans	14	17
		Crop 3	Beans	16	Teff	10	Soya bean	10	Beans	30	Beans	4	Groundnut	6	Cowpea	2	Groundnut	6	Sunflower		Soya bean	4	Beans	13	Groundnut	13	Soya bean	10	10
		Crop 4	Soya bean	12	Sorghum	9	Cowpea	5	Cowpea	6	Groundnut	4	Soya bean	13	Soya bean	8	Millet	2	Wheat		Pigeon pea	2	Millet	6	Beans	17	Sorghum	12	8
		Total		**89**		**73**		**49**		**124**		**55**		**91**		**24**		**35**				**58**		**68**		**120**		**95**	73
5	Percentage of varieties with climate-smart features released in last 3 years (%)	Crop 1	Maize	75%	Maize	75%	Maize	?	Maize	51%	Maize	0%	Maize	88%	Maize	60%	Maize	63%	Maize	93%	Maize	14%	Maize	31%	Maize	51%	Maize	62%	55%
		Crop 2	Rice	25%	Wheat	27%	Rice	?	Sorghum	100%	Rice	29%	Beans	0%	Rice	67%	Rice	47%	Soya bean	70%	Beans	0%	Sorghum	75%	Rice	33%	Beans	43%	43%
		Crop 3	Beans	50%	Teff	25%	Soya bean	0%	Beans	36%	Beans	0%	Groundnut	0%	Cowpea	0%	Groundnut	44%	Sunflower	32%	Soya bean	0%	Beans	60%	Groundnut	50%	Soya bean	0%	23%
		Crop 4	Soya bean	0%	Sorghum	29%	Cowpea	0%	Cowpea	100%	Groundnut	0%	Soya bean	0%	Soya bean	0%	Millet	57%	Wheat	50%	Pigeon pea	50%	Millet	40%	Beans	50%	Sorghum	100%	37%
B.	INDUSTRY COMPETITIVENESS																												
6	Number of active seed companies (for focus crops only)	Crop 1	Maize	56	Maize	18	Maize	17	Maize	19	Maize	11	Maize	21	Maize	15	Maize	89	Maize	16	Maize	29	Maize	21	Maize	10	Maize	13	26
		Crop 2	Rice	36	Wheat	8	Rice	8	Sorghum	9	Rice	41	Beans	19	Rice	3	Rice	51	Soya bean	12	Beans	6	Sorghum	12	Rice	5	Beans	8	17
		Crop 3	Beans	28	Teff	9	Soya bean	5	Beans	12	Beans	20	Groundnut	14	Cowpea	11	Groundnut	109	Sunflower	9	Soya bean	2	Beans	17	Groundnut	4	Soya bean	6	19
		Crop 4	Soya bean	28	Sorghum	3	Cowpea	9	Cowpea	9	Groundnut	11	Soya bean	18	Soya bean	6	Millet	93	Wheat	4	Pigeon pea	1	Millet	6	Beans	4	Sorghum	7	15
		Total		**73**		**21**		**17**		**22**		**48**		**22**		**35**		**138**		**41**		**30**		**22**		**10**		**16**	38
7	Time taken to import/export seed from neighbouring countries (days)	Import seed (days)		16		100		90		38		24		14		21		-		18		12		15		11		30	32
		Import score (out of 100)		**20**		**40**		**20**		**50**		**73**		**83**		**74**		**-**		**66**		**63**		**70**		**55**		**44**	55
		Export seed (days)		-		-		-		14		-		20		-		-		12		-		15		12		35	18
		Export score (out of 100)		-		-		-		69		-		63		-		-		61		-		60		60		27	57
8	Total sales of certified seed (metric tons)	Crop 1	Maize	1,807	Maize	27,756	Maize	1,432	Maize	38,835	Maize	172	Maize	14,350	Maize	4,375	Maize	11,712	Maize	33,223	Maize	8,308	Maize	17,013	Maize	33,018	Maize	44,150	18,165
		Crop 2	Rice	430	Wheat	40,544	Rice	103	Sorghum	1,075	Rice	1,233	Beans	1,061	Rice	650	Rice	12,485	Soya bean	7,659	Beans	77	Sorghum	1,857	Rice	295	Beans	1,078	5,273
		Crop 3	Beans	331	Teff	2,654	Soya bean	43	Beans	1,322	Beans	193	Groundnut	1,561	Cowpea	364	Groundnut	75,286	Sunflower	2,444	Soya bean	4	Beans	2,957	Groundnut	621	Soya bean	2,750	6,964
		Crop 4	Soya bean	244	Sorghum	60	Cowpea	87	Cowpea	463	Groundnut	22	Soya bean	1,614	Soya bean	689	Millet	5,908	Wheat	14,515	Pigeon pea		Millet	12	Beans	719	Sorghum	1,300	2,136
	Market share concentration Herfindahl-Hirschman Index (out of 10,000)	Crop 1	Maize	914	Maize	1,904	Maize	1,620	Maize	5,438	Maize	2,272	Maize	3,539	Maize	2,623	Maize	274	Maize	3,079	Maize	1,973	Maize	1,425	Maize	1,952	Maize	3,380	2,338
		Crop 2	Rice	689	Wheat	3,009	Rice	2,287	Sorghum	4,576	Rice	781	Beans	2,574	Rice	?	Rice	375	Soya bean	1,226	Beans	2,589	Sorghum	1,703	Rice	4,898	Beans	2,370	2,257
		Crop 3	Beans	876	Teff	3,898	Soya bean	3,072	Beans	2,472	Beans	2,583	Groundnut	2,013	Cowpea	4,379	Groundnut	289	Sunflower	3,159	Soya bean	5,102	Beans	1,214	Groundnut	4,765	Soya bean	8,297	3,240
		Crop 4	Soya bean	968	Sorghum	3,337	Cowpea	2,798	Cowpea	3,505	Groundnut	2,816	Soya bean	3,308	Soya bean	4,218	Millet	744	Wheat	7,168	Pigeon pea		Millet	5,139	Beans	3,530	Sorghum	3,565	3,425
	Market share of top four companies (weighted by volume)	Crop 1	Maize	48%	Maize	81%	Maize	72%	Maize	88%	Maize	94%	Maize	95%	Maize	80%	Maize	32%	Maize	94%	Maize	76%	Maize	69%	Maize	81%	Maize	95%	77%
		Crop 2	Rice	40%	Wheat	97%	Rice	77%	Sorghum	93%	Rice	44%	Beans	87%	Rice	100%	Rice	37%	Soya bean	60%	Beans	94%	Sorghum	72%	Rice	100%	Beans	85%	76%
		Crop 3	Beans	50%	Teff	95%	Soya bean	98%	Beans	82%	Beans	65%	Groundnut	80%	Cowpea	96%	Groundnut	30%	Sunflower	90%	Soya bean	100%	Beans	61%	Groundnut	100%	Soya bean	95%	80%
		Crop 4	Soya bean	57%	Sorghum	100%	Cowpea	87%	Cowpea	91%	Groundnut	95%	Soya bean	93%	Soya bean	97%	Millet	40%	Wheat	99%	Pigeon pea	100%	Millet	100%	Beans	100%	Sorghum	91%	88%
		No. of companies in top four, for four crops		**13**		**7**		**8**		**10**		**?**		**7**		**7**		**7**		**8**		**7**				**7**		**8**	8
9	Market share of government parastatal(s)	Crop 1	Maize	0%	Maize	59%	Maize	0%	Maize	68%	Maize	0%	Maize	0%	Maize	0%	Maize	0%	Maize	0%	Maize	1%	Maize	0%	Maize	0%	Maize	3%	10%
		Crop 2	Rice	0%	Wheat	77%	Rice	0%	Sorghum	28%	Rice	6%	Beans	0%	Rice	0%	Rice	0%	Soya bean	0%	Beans	4%	Sorghum	0%	Rice	0%	Beans	3%	9%
		Crop 3	Beans	0%	Teff	62%	Soya bean	0%	Beans	64%	Beans	10%	Groundnut	0%	Cowpea	0%	Groundnut	0%	Sunflower	0%	Soya bean	43%	Beans	0%	Groundnut	0%	Soya bean	4%	14%
		Crop 4	Soya bean	0%	Sorghum	83%	Cowpea	0%	Cowpea	86%	Groundnut	0%	Soya bean	0%	Soya bean	0%	Millet	0%	Wheat	0%	Pigeon pea	0%	Millet	0%	Beans	0%	Sorghum	6%	13%

COLOR CODES: Extremely poor (0-19.99) | Poor (20-39.99) | Fair (40-59.99) | Good (60-79.99) | Excellent (80-100)

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		Country	DR-CONGO	ETHIOPIA	GHANA	KENYA	MADAGASCAR	MALAWI	MOZAMBIQUE	SENEGAL	SOUTH AFRICA	TANZANIA	UGANDA	ZAMBIA	ZIMBABWE	AVERAGE
		Year	2016	2016	2016	2015	2016	2016	2016	2016	2016	2016	2017	2016	2016	
C.	SEED POLICY AND REGULATION															
10	Length of variety release process	Time (months)	26	46	42	33	43	34	24	36	20	31	28	24	18	31
		Satisfaction with variety release (out of 100)	62	71	43	47	54	58	53	74	83	70	75	84	63	66
11	Status of seed policy frameworks*	Seed Policy (year)	2006 (draft)	1993	2013	2010	no policy	1993 (2014)	no policy	no policy	2012	Agric policy	2016 (draft)	1999	no policy	2005
		Latest amendment to Seed Law (year)	2007 (draft)	2013	2010	2012	1995	1996 (2013)	no law	1994	2015	2014	2006	1995	1971	2003
		Latest Seed Regulations (year)	2007 (draft)	2016	2015	2016	2010	1997	2013	1997	2015	2007	2017	2015	2016	2011
		Regional harmonization	parliament appr. Pending (COMESA)	Amendments on-going (COMESA)	Amendments on-going (ECOWAS)	harmonized (COMESA)	Amendments on-going (COMESA)	Amendments on-going (COMESA)	harmonized (SADC)	harmonized (ECOWAS)	Not yet harmonized (SADC)	Amendments on-going (SADC)	harmonized (COMESA)	regulations appr. Pending (COMESA)	harmonized (COMESA)	
		Seed plan/strategy (year)	no seed plan	2013	2015	no seed plan	2008	no seed plan	2015	no seed plan	2015	no seed plan	2016	no seed plan	no seed plan	2,013
12	Quality of seed law/regulations	Score (out of 100)	58	65	78	63	65	54	69	75	79	70	60	77	88	69
	Quality of enforcement systems	Score (out of 100)	51	57	56	61	47	46	64	74	69	70	46	68	77	60
13	Adequacy of seed inspectors	# Public inspectors	105	32	32	64	60	37	25	21	400	48	7	35	14	68
		# Private inspectors	0	0	0	12	0	0	0	0	180	0	0	83	46	25
		# Total inspectors	105	32	32	76	60	37	25	21	580	48	7	118	60	92
		Score (out of 100)	33	68	49	62	63	49	59	22	79	59	59	67	84	58
14	Efforts to stamp out fake seed	Reported cases in 1 year	185	11	7	6	34	20	11	39	6	18	14	22	52	34
		Score (out of 100)	22	57	32	50	37	38	52	52	50	57	53	57	56	47
15	Use of smart subsidies[3]	% of seed sold as subsidy	0%	0%	0%	0%	0%	70%	16%		0%	46%	48%	38%	7%	19%
		Govt. expenditure on seed subsidy ($ mill)	0	0	0	0	0	13	1		0	3	0	23	28	6
		% of price subsidy	0%	0%	0%	0%	100%		70%		0%	30%	0%	30%	0%	21%
		Years of subsidy (years up to 2016)	-	-	-	-		11	18		0	11	0	14	6	9
		Method of subsidy distribution	-	-	-	-	public	private (voucher)	private (voucher)		-	80% private (voucher)	public (military)	private (e-voucher)	public (govt. warehouses)	
D.	INSTITUTIONAL SUPPORT															
16	Availability of extension services	Households per extension officer	Relief prog. 5,898	592	1,500	910	26,000	1,388	1,045		1,059	831	5,000	560	127	3,743
		Score (out of 100)	54	55	52		40	47	56	22	46	56	59	55	72	50
17	Quality of national seed traders' association (Score out of 100)	Activity on important seed sector issues	37	66	46	63	38	78	55	73	91	73	64	69	71	63
		Effectiveness in advocacy	32	53	44	57	41	75	52	66	82	75	66	64	64	59
		Managerial ability	32	63	43	60	44	69	53	59	86	71	65	65	63	59
		Providing value to members	30	71	38	62	39	74	54	59	84	69	66	65	50	59
		Democracy in the elections and decision making	35	69	64	73	40	88	77	60	87	74	71	83	49	67
		Ability to mobilize resources	23	65	36	57	39	63	51	58	82	68	51	58	51	54
		Overall score (out of 100)	32	66	46	62	45	73	59	62	81	71	65	69	50	60
E.	SERVICE TO SMALLHOLDER FARMERS															
18	Concentration of rural-agro dealers	Number of agro-dealers	161	650	3,153	5,240	143	2,000	211	97		2,000	2,500	450	1,278	1,490
		Agricultural households per agro-dealer	43,882	27,841	794	1,221	17,300	1,320	15,000	7,788		2,900	1,580	3,276	438	11,069
		Score (out of 100)	30	47	64		64	64		25	61	66	61	57	75	55
19	Availability of seed in small packages (% of seed sold in packages of 2kgs or less)	% volume sold (weighted)	31%	0%	66%	79%	32%	29%	64%	0%	<5%	93%	25%	19%	6%	37%
		Crop 1	Maize 28%	Maize 0%	Maize 74%	Maize 73%	Maize 27%	Maize 17%	Maize 66%	Maize 0%	Maize <5%	Maize 93%	Maize 25%	Maize 20%	Maize 7%	36%
		Crop 2	Rice 26%	Wheat 0%	Rice 29%	Sorghum 96%	Rice 35%	Beans 79%	Rice 60%	Rice 0%	Soya bean 0%	Beans 92%	Sorghum 48%	Rice 0%	Beans 7%	36%
		Crop 3	Beans 31%	Teff 1%	Soya bean 14%	Beans 93%	Beans 28%	Groundnut 87%	Cowpea 88%	Groundnut 0%	Sunflower <1%	Soya bean 34%	Beans 9%	Groundnut 0%	Soya bean 1%	32%
		Crop 4	Soya bean 55%	Sorghum 0%	Cowpea 42%	Cowpea 100%	Groundnut 28%	Soya bean 42%	Soya bean 21%	Millet 0%	Wheat 0%	Pigeon pea 30%	Millet 100%	Beans 4%	Sorghum 4%	33%
		Score (out of 100)	57	60	72		50	78	73		50	88	75	72	75	68
20	Seed price divided by grain price (at planting time)	Maize (seed price divided by grain price)	OPV 5.0	OPV 3.6	OPV 4.3	OPV 3.7	OPV 2.4	OPV 4.1	OPV 3.8	OPV 2.9	OPV 5.0	OPV 5.2	OPV 3.0	OPV 10.0	OPV 3.6	4.4
		Maize (seed price divided by grain price)	Hybrid 5.5	Hybrid 7.1	Hybrid 6.0	Hybrid 4.5	Hybrid n/a	Hybrid 4.2	Hybrid 4.8	Hybrid n/a	Hybrid 34.4	Hybrid 8.7	Hybrid 6.0	Hybrid 13.4	Hybrid 9.3	9.4
		Crop 2 (seed price divided by grain price)	Rice 1.8	Wheat 1.9	Rice 1.7	Sorghum 3.0	Rice 2.3	Beans 1.5	Rice 3.3	Rice 1.7	Soya bean 4.9	Beans 1.4	Sorghum 1.2	Rice 1.4	Beans 2.1	2.2
		Crop 3 (seed price divided by grain price)	Beans 1.4	Teff 1.4	Soya bean 4.4	Beans 1.8	Beans 2.2	Groundnut 1:9	Cowpea 1.5	Groundnut 1.1	Sunflower 22.9	Soya bean 2.0	Beans 1.2	G' nut OPV 1.3	Soya bean 2.6	3.7
		Crop 4 (seed price divided by grain price)	Soya bean 1.6	Sorghum 2.2	Cowpea 2.0	Cowpea 1.5	Groundnut 1.5	Soya bean 1:8	Soya bean 1.6	Millet 3.0	Wheat 3.0	Pigeon pea	Millet 1.1	Beans 2.3	Sorghum OPV 6.9	2.4
	Seed price (USD per kg)	Maize (seed price in USD per kg)	OPV 1.6	OPV 0.6	OPV 1.5	OPV 1.7	OPV 0.6	OPV 1.2	OPV 1.9	OPV 0.9	OPV 1.2	OPV 1.3	OPV 0.8	OPV 1.5	OPV 1.4	1.2
		Maize (seed price in USD per kg)	Hybrid 3.1	Hybrid 1.3	Hybrid 2.2	Hybrid 1.8	Hybrid n/a	Hybrid 1.3	Hybrid 2.4	Hybrid n/a	Hybrid 8.0	Hybrid 2.2	Hybrid 1.5	Hybrid 2.6	Hybrid 2.8	2.6
		Crop 2 (seed price in USD per kg)	Rice 2.0	Wheat 0.7	Rice 1.0	Sorghum 1.5	Rice 0.6	Beans 1.5	Rice 0.8	Rice 0.8	Soya bean 2.4	Beans 1.1	Sorghum 0.4	Rice 1.8	Beans 2.8	1.3
		Crop 3 (seed price in USD per kg)	Beans 2.3	Teff 1.1	Soya bean 1.8	Beans 1.8	Beans 1.3	Groundnut 1.5	Cowpea 1.7	Groundnut 0.6	Sunflower 11.1	Soya bean 1.3	Beans 0.8	G' nut OPV 2.8	Soya bean 1.6	2.3
		Crop 4 (seed price in USD per kg)	Soya bean 2.6	Sorghum 0.7	Cowpea 2.1	Cowpea 1.5	Groundnut 1.3	Soya bean 1.1	Soya bean 1.4	Millet 0.9	Wheat 1.2	Pigeon pea 0.4	Millet 0.8	Beans 2.6	Sorghum OPV 1.6	1.4

COLOR CODES: Extremely poor (0-19.99) | Poor (20-39.99) | Fair (40-59.99) | Good (60-79.99) | Excellent (80-100)

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